IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

TAKIZAWA et al. Atty. Ref.: 723-1431; Confirmation No. 5893

Appl. No. 10/675,940 TC/A.U. 2628

Filed: October 2, 2003 Examiner: Jeffery A. Brier

For: GAME APPARATUS AND GAME PROGRAM

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(May 17, 2008 = Saturday)
May 19, 2008 (= Monday)

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

SUPPLEMENTAL AMENDMENT

Further to the Amendment filed January 30, 2008, and in response to the Notice of Non-Compliant Amendment dated April 17, 2008, please amend the above-identified application as follows:

AMENDMENTS TO THE CLAIMS:

1. (Currently Amended) A game apparatus for displaying an object in a game space, the apparatus comprising:

light source setting programmed logic circuitry for setting, in the game space, *n* light sources (where *n* is an integer equal to or more than 2) for irradiating the object with a light beam;

a brightness calculator for calculating, for each of predetermined units forming the object, a brightness vector having as components *n* illumination intensities respectively added by the *n* light sources;

at least one threshold value storage location having threshold values of the *n* illumination intensities stored therein, the threshold values being used for dividing a coordinate ~~region~~ system for the brightness vector into at least three regions;

region determining programmed logic circuitry for determining, for each of the predetermined units, a region including a tip of the brightness vector calculated by the brightness calculator from among the regions obtained via division by the threshold values based on whether or not the illumination intensity of each of the *n* illumination intensities is greater than, less than or equal to the corresponding threshold value; and

display color determining programmed logic circuitry for determining a display color for each of the predetermined units based on the region determined for each of the predetermined units by the region determining programmed logic circuitry, such that the object's display color distinctly varies.

2. (Previously Presented) The game apparatus according to claim 1, wherein:

the light source setting programmed logic circuitry sets a first light source emitting a light beam of a first color, and a second light source emitting a light beam of a second color which is different from the first color;

wherein said brightness vector is composed of the illumination intensities corresponding to values of color components of the first and second colors; and

the region determining programmed logic circuitry determines the region including the tip of the brightness vector by determining a relationship in size between the value of the color component of the first color and its corresponding first threshold value, and a relationship in size between the value of the color component of the second color and its corresponding second threshold value.

3. (Previously Presented) The game apparatus according to claim 2, wherein:

the first color is either one of red, green, or blue; and

the second color differs from the first color, and is either one of red, green, or blue.

4. (Currently Amended) The game apparatus according to claim 2, wherein:

the coordinate ~~region~~ system is divided into different regions by the first threshold value, and is further divided into different regions by the second threshold value; and

the display color determining programmed logic circuitry determines display colors of different brightness in accordance with the regions obtained by division by the first threshold value, and determines display colors of different types in accordance with the regions obtained by division by the second threshold value.

5. (Previously Presented) The game apparatus according to claim 4, wherein the display color determining programmed logic circuitry determines, in accordance with the regions obtained by division by the second threshold value, either a color used for representing an object influenced by a special effect generated in the game space or a color used for representing an object in the case where no special effects are generated.

6. (Previously Presented) The game apparatus according to claim 5, further comprising special effect determining programmed logic circuitry for determining whether the special effect is generated in the game space, wherein the light source setting programmed logic circuitry provides the second light source only when the special effect determining programmed logic circuitry determines that the special effect has been generated.

7. (Previously Presented) The game apparatus according to claim 1, further comprising at least one display color storage location having basic display colors stored therein, the basic display colors being used for determining the display color of each object, wherein the display color determining programmed logic circuitry determines the display color based on the region determined by the region determining programmed logic circuitry and the basic display colors stored in the at least one display color storage location.

8. (Previously Presented) The game apparatus according to claim 7, wherein:

the region determining programmed logic circuitry represents a determined region by a numerical value; and

the display color determining programmed logic circuitry determines the display color by performing a predetermined calculation using the numerical value representing the region determined by the region determining programmed logic circuitry and color data for the basic display colors.

9. (Previously Presented) The game apparatus according to claim 1, wherein the predetermined units are polygons forming the object.

10. (Previously Presented) A game apparatus for displaying an object in a game space, the apparatus comprising:

first light source setting programmed logic circuitry for setting, in the game space, a first light source for irradiating the object with a light beam;

second light source setting programmed logic circuitry for setting, in the game space, a second light source which is different from the first light source;

a brightness calculator for calculating, for each of predetermined units forming the object, a first illumination intensity added by the first light source and a second illumination intensity added by the second light source;

at least one threshold value storage location having threshold values of the first and second illumination intensities stored therein;

first detecting programmed logic circuitry for detecting, for each of the predetermined units, whether the first illumination intensity is greater than, less than, or equal to the corresponding threshold value;

second detecting programmed logic circuitry for detecting, for each of the predetermined units, whether the second illumination intensity is greater than, less than, or equal to the corresponding threshold value; and

display color determining programmed logic circuitry for determining a display color for each of the predetermined units based on detection results obtained for each of the predetermined units by the first and second detecting programmed logic circuitry, such that the object's display color distinctly varies.

11. (Previously Presented) The game apparatus according to claim 10, wherein the predetermined units are polygons forming the object.

12. (Previously Presented) A computer-readable recording medium having a game program recorded therein, the game program causing a game apparatus to implement a game in which an object is displayed in a game space, the game program causing the game apparatus to implement:

setting, in the game space, *n* light sources (where *n* is an integer equal to or more than 2) for irradiating the object with a light beam;

calculating, for each of predetermined units forming the object, a brightness vector having as components *n* illumination intensities respectively added by the *n* light sources;

determining, for each of the predetermined units, a region including a tip of the brightness vector calculated by the calculating from among at least three regions into which a coordinate system for the brightness vector is divided by threshold values of the *n* illumination

intensities, based on whether or not the illumination intensity of each of the *n* illumination intensities is greater than, less than or equal to the corresponding threshold value; and

determining a display color for each of the predetermined units based on the region determined for each of the predetermined units by the determining a region, such that the object's display color distinctly varies.

13. (Previously Presented) The computer-readable recording medium according to claim 12, wherein:

the setting sets a first light source emitting a light beam of a first color, and a second light source emitting a light beam of a second color which is different from the first color;

wherein the brightness vector is composed of the illumination intensities corresponding to values of color components of the first and second colors; and

determining a region determines the region including the tip of the brightness vector by determining a relationship in size between the value of the color component of the first color and its corresponding first threshold value, and a relationship in size between the value of the color component of the second color and its corresponding second threshold value.

14. (Previously Presented) The computer-readable recording medium according to claim 13, wherein:

the first color is either one of red, green, or blue; and

the second color differs from the first color, and is either one of red, green, or blue.

15. (Previously Presented) The computer-readable recording medium according to claim 13, wherein:

the coordinate system is divided into different regions by the first threshold value, and is further divided into different regions by the second threshold value; and

determining a display color determines display colors of different brightness in accordance with the regions obtained by division by the first threshold value, and determines display colors of different types in accordance with the regions obtained by division by the second threshold value.

16. (Previously Presented) The computer-readable recording medium according to claim 15, wherein the determining a display color determines, in accordance with the regions obtained by division by the second threshold value, either a color used for representing an object influenced by a special effect generated in the game space or a color used for representing an object in the case where no special effects are generated.

17. (Previously Presented) The computer-readable recording medium according to claim 16, wherein:

the game program further causes the game apparatus to implement determining whether the special effect is generated in the game space; and

the setting provides the second light source only when the determining whether the special effect is generated determines that the special effect has been generated.

18. (Previously Presented) The computer-readable recording medium according to claim 12, wherein:

the game apparatus has basic display colors stored therein, the basic display colors being used for determining the display color of each object; and

the determining a display color determines the display color based on the region determined at the determining a region and the basic display colors stored in the game apparatus.

19. (Previously Presented) The computer-readable recording medium according to claim 18, wherein:

the determining a region represents a determined region by a numerical value; and

the determining a display color determines the display color by performing a predetermined calculation using the numerical value representing the region determined at the determining a region and color data for the basic display colors.

20. (Previously Presented) The computer-readable recording medium according to claim 12, wherein the predetermined units are polygons forming the object.

21. (Previously Presented) A computer-readable recording medium having a game program recorded therein, the game program causing a game apparatus to implement a game in which an object is displayed in a game space, the game program causing the game apparatus to implement:

setting, in the game space, a first light source for irradiating the object with a light beam;

setting, in the game space, a second light source which is different from the first light source;

calculating, for each of predetermined units forming the object, a first illumination intensity added by the first light source and a second illumination intensity added by the second light source;

detecting, for each of the predetermined units, whether the first illumination intensity is greater than, less than, or equal to the corresponding threshold value;

detecting, for each of the predetermined units, whether the second illumination intensity is greater than, less than, or equal to the corresponding threshold value; and

determining a display color for each of the predetermined units based on detection results obtained for each of the predetermined units by the detecting whether the first and second intensities are greater than, less than, or equal to the corresponding threshold values, such that the object's display color distinctly varies.

22. (Previously Presented) The computer-readable recording medium according to claim 21, wherein the predetermined units are polygons forming the object.

REMARKS/ARGUMENTS

In view of the amendments and remarks herein, favorable reconsideration and allowance of this application are respectfully requested. By this Amendment, claims 1 and 4 have been amended. Claims 1-22 are pending for further examination.

In a conversation between the Examiner and a representative of the undersigned on April 24, 2008, the Examiner indicated that the amendments to the claims herein should be presented as amendments to the listing of claims in the October 1, 2007 Amendment.

Claims 1-22 stand rejected under 35 U.S.C § 103(a) as allegedly being unpatentable over Sangwine in view of Miller and further in view of Atherton et al. Applicant submits that the applied references do not teach or suggest all elements of the claimed combination.

While Sangwine does teach a typical color determination (i.e., using the three RGB components of a color to determine a display color), this is not what Applicant has claimed. Applicant has claimed, for example, "the threshold values being used for dividing a coordinate system for the brightness vector into at least three regions." Sangwine says nothing about dividing a coordinate system into at least three regions. Just because the color determination of Sangwine is based on three components does not mean that Sangwine has taught dividing a coordinate system into at least three regions based on the threshold values.

After dividing a coordinate system into regions based on the threshold values, Applicant's claimed system "determine[es], for each of the predetermined units, a region including a tip of the brightness vector calculated by the brightness calculator from among the regions obtained via division by the threshold values based on whether or not the illumination intensity of each of the *n* illumination intensities is greater than, less than or equal to the

corresponding threshold value," as required by independent claim 1 and its dependents. Independent claims 10, 12, and 21 require similar, but not identical limitations.

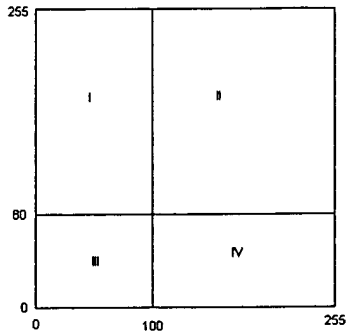
The above noted claim limitation corresponds to comparing the actual value of each of the *n* illumination intensities to the corresponding threshold value, and determining the side of the threshold division on which that "coordinate" lies. Once this has been done for all of the *n* illumination values, the region in which the vector tip (the vector being an *n*-dimensional vector) lies may be determined.

Nothing in any of the prior art of record teaches or suggests that such a comparison is made, nor that a determination is made as to the region in which a vector tip then lies (the regions having been determined as claimed).

Finally, Applicant has claimed and "display color determining programmed logic circuitry for determining a display color for each of the predetermined units based on the region." This corresponds to selecting the color assigned to the whole region in which the vector tip lies and applying it.

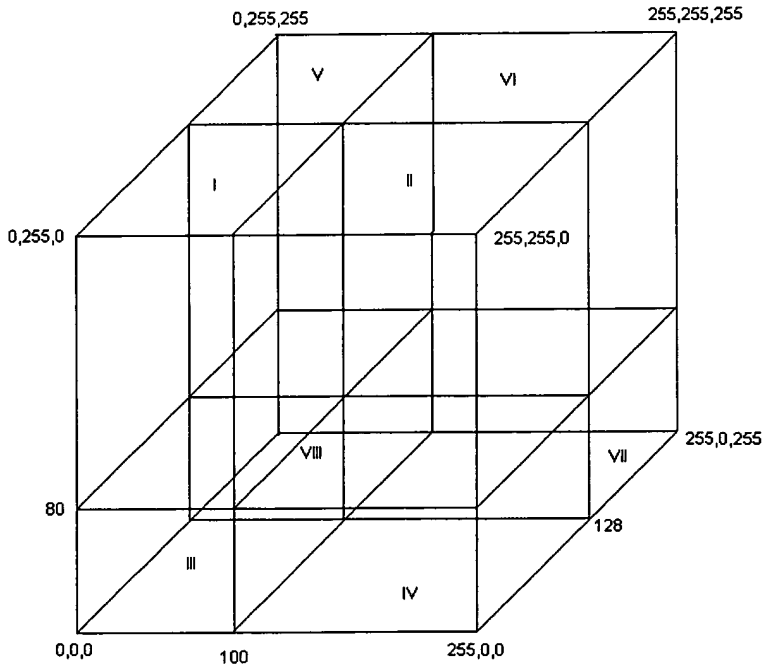
An illustrative description of an exemplary embodiment of Applicant's system follows:

Assume, for example, that illumination intensities range from 0-255, and that $n = 2$. Then, take a 2-dimensional coordinate space and divide it at some location along each axis, the division point being the threshold value. This will give a plurality (four in this example) of quadrants (the "regions"). If the first threshold is 100 and the second threshold is 80, the regions might then appear as follows:



Next, two illuminations are considered, $I_1 = 72$ and $I_2 = 150$. The vector tip thus lies at 72, 150, or in quadrant I. Each of quadrants I-IV has a color value assigned thereto, and any vector landing in the given quadrant correlates with that value, and the unit from which the vector was produced is then assigned that color value.

A similar calculation can be represented in three dimensional space as follows (once *n* exceeds 3, it is more difficult to represent the system graphically):



In this case, $n = 3$, so there is a 3-coordinate vector, for example (20, 200, 180). This vector tip would then lie in quadrant VIII, and the color value assigned to quadrant VIII would be assigned to the unit whose three illumination intensities were 20, 200, and 180.

No such divisions, comparisons, or determinations are taught or suggested by any of the prior art. The cited teaching from Miller only teaches how to reassign coordinates in a (255,255,255) cube to a (1,1,1) cube using simple division.

Applicant has shown the 3-dimesional example above to help distinguish from the teachings of the prior art. If the cube above were the cube of Sangwine or Miller, each individual point within the cube would have a different color value assigned to it. There are no regions of the Sangwine and Miller cubes, only points. The cubes of Sangwine and Miller are not divided by any threshold values, they are bounded by maximum values. Assignments of color based on those cubes are similarly not done by region, only by point. Finally, there is no determination of the region in which a vector lies based on whether its components are each greater than, less than, or equal to a corresponding threshold value; rather there simply is a determination as to which point is selected based on which values each of the three components ranging from 0-255 or 0-1 are equal to.

Applicant respectfully submits that the inclusion of Atherton does not cure the above-noted deficiencies of the Miller/Sangwine combination.

For at least these reasons, Applicant submits that claim 1 is allowable over the prior art of record. Independent claims 10, 12, and 21 recite similar limitations and should be allowable for at least similar reasons. Claims 2-9, 11, 13-20 and 22 should be allowable based at least on their dependency from allowable claims 1, 10, 12, and 21.

For at least the foregoing reasons, Applicant respectfully submits that the invention defined by the amended claims herein is not taught or suggested by the prior art of record. Thus, withdrawal of the rejections and allowance of this application are earnestly solicited.

Should the Examiner have any questions or believe that any minor matters need to be addressed before this case is presented for allowance, the Examiner is invited to contact the undersigned attorney at the phone number below.

Respectfully submitted,

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